AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): A method for synthesizing moving images, comprising the steps of:

sampling two consecutive frames from a moving image;

providing a reference patch having at least one rectangular region therein, in one of the two frames, which is designated as a reference frame;

providing a second patch, which is the same as the reference patch, in the other of the two frames;

moving and/or deforming the second patch in the other of the two frames so that an image within the second patch matches that within the reference image;

estimating correspondent relationships among ~~the~~ pixels within the second patch of the other frame and ~~the~~ pixels within the reference patch of the reference frame, based on the second patch after the movement and/or deformation thereof and the reference patch;

obtaining a coordinate converted frame, by coordinate converting the image within the second patch into a coordinate space of the reference frame, based on the correspondent relationships;

calculating a correlative value, which represents ~~the~~ a degree of correlation between the images within the reference patch of the reference frame and the coordinate converted frame;

varying ~~a~~ the number of <u>said at least one</u> rectangular regions within the reference patch and the second patch in a stepwise manner, estimating the ~~aforementioned~~ correspondent relationships, obtaining the coordinate converted frames, and calculating the correlative values for each number of <u>said at least one</u> rectangular regions, thereby obtaining a plurality of correlative values corresponding to the number of rectangular regions within the reference patch and the second patch;

comparing the degrees of correlation for each number of <u>said at least one</u> rectangular regions, based on the plurality of the correlative values; and

generating a synthesized frame having a higher resolution than either of the two frames, by administering interpolation calculations on the images within the second patch and the reference patch, based on the correspondent relationships, which were estimated among the pixels of the reference patch and the second patch having the number of <u>said at least one</u> rectangular regions therein that yielded the highest degree of correlation.

2. (currently amended): A method for synthesizing moving images, comprising the steps of:

sampling at least three consecutive frames from a moving image;

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providing a reference patch having at least one rectangular region therein, in a first frame from among the at least three sampled frames, which is designated as a reference frame;

providing a second patch, which is the same as the reference patch, in another of the plurality of sampled frames;

moving and/or deforming the second patch in the other frame so that an image within the second patch matches that within the reference image;

estimating correspondent relationships among the-pixels within the second patch of the other frame and the-pixels within the reference patch of the reference frame, based on the second patch after the movement and/or deformation thereof and the reference patch;

obtaining a coordinate converted frame, by coordinate converting the image within the second patch into a coordinate space of the reference frame, based on the correspondent relationships;

calculating a correlative value, which represents the-a degree of correlation between the images within the reference patch of the reference frame and the coordinate converted frame;

varying the number of said at least one rectangular regions within the reference patch and the second patch in a stepwise manner, estimating the aforementioned correspondent relationships, obtaining the coordinate converted frames, and calculating the correlative values for each number of said at least one rectangular regions, thereby obtaining a plurality of correlative values corresponding to the number of said at least one rectangular regions within the reference patch and the second patch;

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comparing the degrees of correlation for each number of <u>said at least one</u>

rectangular regions, based on the plurality of the correlative values;

obtaining an intermediate synthesized frame having a higher resolution than either

the reference frame of the other frame, by administering interpolation calculations on the images

within the second patch and the reference patch, based on the correspondent relationships, which

were estimated among the pixels of the reference patch and the second patch having the number

of <u>said at least one </u>rectangular regions therein that yielded the highest degree of correlation;

obtaining a plurality of intermediate synthesized frames by estimating the ~~aforementioned~~

correspondent relationships, obtaining the coordinate converted frames, calculating the plurality

of correlative values, and comparing the degrees of correlation for all of the plurality of sampled

frames; and

generating a synthesized frame by synthesizing the plurality of intermediate synthesized

frames.

3. (currently amended): A moving image synthesizing apparatus, comprising:

a sampling means, for sampling two consecutive frames from a moving image;

a correspondent relationship estimating means, for: providing a reference patch

having at least one rectangular region therein, in one of the two frames, which is designated as a

reference frame;————providing a second patch, which is the same as the reference patch, in the

other of the two frames; moving and/or deforming the second patch in the other of the two

frames so that an image within the second patch matches that within the reference image; and

estimating correspondent relationships among ~~the ~~pixels within the second patch of the other

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frame and ~~the~~ pixels within the reference patch of the reference frame, based on the second patch after the movement and/or deformation thereof and the reference patch;

a coordinate converting means, for obtaining a coordinate converted frame, by coordinate converting the image within the second patch into a coordinate space of the reference frame, based on the correspondent relationships;

a correlative value calculating means, for calculating a correlative value, which represents ~~the~~ a degree of correlation between the images within the reference patch of the reference frame and the coordinate converted frame;

a control means, for controlling the correspondent relationship estimating means, the coordinate converting means, and the correlative value calculating means, to vary the number of said at least one rectangular regions within the reference patch and the second patch in a stepwise manner, to estimate the ~~aforementioned~~ correspondent relationships, to obtain the coordinate converted frames, and to calculate the correlative values for each number of said at least one rectangular regions, thereby obtaining a plurality of correlative values corresponding to the number of said at least one rectangular regions within the reference patch and the second patch;

a comparing means, for comparing the degrees of correlation for each number of said at least one rectangular regions, based on the plurality of the correlative values; and

a synthesizing means, for generating a synthesized frame having a higher resolution than either of the two frames, by administering interpolation calculations on the images within the second patch and the reference patch, based on the correspondent relationships, which were estimated among the pixels of the reference patch and the second patch

having the number of <u>said at least one</u> rectangular regions therein that yielded the highest degree

of correlation.

4. (original): A moving image synthesizing apparatus as defined in claim 3, wherein:

the correspondent relationships employed in the generation of the synthesized

frame are those which are estimated for each of the rectangular regions.

5. (original): A moving image synthesizing apparatus as defined in claim 3, wherein:

the correspondent relationship estimating means, the coordinate converting

means, the correlative value calculating means, and the synthesizing means employ at least one

component that constitutes the frames during the estimation of the correspondent relationships,

the obtainment of the coordinate converted frames, the calculation of the correlative values, and

the generation of the synthesized frame.

6. (currently amended): A moving image synthesizing apparatus, comprising:

a sampling means, for sampling at least three consecutive frames from a moving

image;

a correspondent relationship estimating means, for: providing a reference patch

having at least one rectangular region therein, in a first frame from among the at least three

sampled frames, which is designated as a reference frame; providing a second patch, which is the

same as the reference patch, in another of the plurality of sampled frames; moving and/or

deforming the second patch in the other frame so that an image within the second patch matches

that within the reference image; and estimating correspondent relationships among the pixels

within the second patch of the other frame and the pixels within the reference patch of the

reference frame, based on the second patch after the movement and/or deformation thereof and

the reference patch;

a coordinate converting means, for obtaining a coordinate converted frame, by

coordinate converting the image within the second patch into a coordinate space of the reference

frame, based on the correspondent relationships;

a correlative value calculating means, for calculating a correlative value, which

represents the a degree of correlation between the images within the reference patch of the

reference frame and the coordinate converted frame;

a control means, for controlling the correspondent relationship estimating means,

the coordinate converting means, and the correlative value calculating means, to vary the number

of said at least one rectangular regions within the reference patch and the second patch in a

stepwise manner, to estimate the aforementioned correspondent relationships, to obtain the

coordinate converted frames, and to calculate the correlative values for each number of said at

least one rectangular regions, thereby obtaining a plurality of correlative values corresponding to

the number of said at least one rectangular regions within the reference patch and the second

patch;

a comparing means, for comparing the degrees of correlation for each number of

said at least one rectangular regions, based on the plurality of the correlative values; and

a synthesizing means, for: obtaining an intermediate synthesized frame having a

higher resolution than either the reference frame of the other frame, by administering

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interpolation calculations on the images within the second patch and the reference patch, based on the correspondent relationships, which were estimated among the pixels of the reference patch and the second patch having the number of said at least one rectangular regions therein that yielded the highest degree of correlation; obtaining a plurality of intermediate synthesized frames by estimating the ~~aforementioned~~ correspondent relationships, obtaining the coordinate converted frames, calculating the plurality of correlative values, and comparing the correlations for all of the plurality of sampled frames; and generating a synthesized frame by synthesizing the plurality of intermediate synthesized frames.

7. (original): A moving image synthesizing apparatus as defined in claim 6, wherein:

the correspondent relationships employed in the generation of the intermediate synthesized frame are those which are estimated for each of the rectangular regions.

8. (original): A moving image synthesizing apparatus as defined in claim 6, wherein:

the correspondent relationship estimating means, the coordinate converting means, the correlative value calculating means, and the synthesizing means employ at least one component that constitutes the frames during the estimation of the correspondent relationships, the obtainment of the coordinate converted frames, the calculation of the correlative values, the generation of the intermediate synthesized frames, and the generation of the synthesized frame.

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9. (currently amended): <u>A recording medium having embodied thereon</u> ~~A~~<u>a</u> program that causes a computer to execute a method for synthesizing moving images, comprising the procedures of:

sampling two consecutive frames from a moving image;

providing a reference patch having at least one rectangular region therein, in one of the two frames, which is designated as a reference frame;

providing a second patch, which is the same as the reference patch, in the other of the two frames;

moving and/or deforming the second patch in the other of the two frames so that an image within the second patch matches that within the reference image;

estimating correspondent relationships among ~~the~~ pixels within the second patch of the other frame and ~~the~~ pixels within the reference patch of the reference frame, based on the second patch after the movement and/or deformation thereof and the reference patch;

obtaining a coordinate converted frame, by coordinate converting the image within the second patch into a coordinate space of the reference frame, based on the correspondent relationships;

calculating a correlative value, which represents ~~the~~ <u>a</u> degree of correlation between the images within the reference patch of the reference frame and the coordinate converted frame;

varying the number of <u>said at least one</u> rectangular regions within the reference patch and the second patch in a stepwise manner, estimating the ~~aforementioned~~ correspondent relationships, obtaining the coordinate converted frames, and calculating the correlative values

for each number of <u>said at least one</u> rectangular regions, thereby obtaining a plurality of

correlative values corresponding to the number of <u>said at least one</u> rectangular regions within the

reference patch and the second patch;

comparing the degrees of correlation for each number of <u>said at least one</u>

rectangular regions, based on the plurality of the correlative values; and

generating a synthesized frame having a higher resolution than either of the two

frames, by administering interpolation calculations on the images within the second patch and

the reference patch, based on the correspondent relationships, which were estimated among the

pixels of the reference patch and the second patch having the number of <u>said at least one</u>

rectangular regions therein that yielded the highest degree of correlation.

10. (currently amended): <u>A recording medium having embodied thereon</u> ~~A~~a program

that causes a computer to execute a method for synthesizing moving images, comprising the

procedures of:

sampling at least three consecutive frames from a moving image;

providing a reference patch having at least one rectangular region therein, in a

first frame from among the at least three sampled frames, which is designated as a reference

frame;

providing a second patch, which is the same as the reference patch, in another of

the plurality of sampled frames;

moving and/or deforming the second patch in the other frame so that an image

within the second patch matches that within the reference image;

estimating correspondent relationships among ~~the~~ pixels within the second patch of the other frame and ~~the~~ pixels within the reference patch of the reference frame, based on the second patch after the movement and/or deformation thereof and the reference patch;

obtaining a coordinate converted frame, by coordinate converting the image within the second patch into a coordinate space of the reference frame, based on the correspondent relationships;

calculating a correlative value, which represents ~~the~~ a degree of correlation between the images within the reference patch of the reference frame and the coordinate converted frame;

varying the number of <u>said at least one</u> rectangular regions within the reference patch and the second patch in a stepwise manner, estimating the ~~aforementioned~~ correspondent relationships, obtaining the coordinate converted frames, and calculating the correlative values for each number of <u>said at least one</u> rectangular regions, thereby obtaining a plurality of correlative values corresponding to the number of <u>said at least one</u> rectangular regions within the reference patch and the second patch;

comparing the degrees of correlation for each number of <u>said at least one</u> rectangular regions, based on the plurality of the correlative values;

obtaining an intermediate synthesized frame having a higher resolution than either the reference frame of the other frame, by administering interpolation calculations on the images within the second patch and the reference patch, based on the correspondent relationships, which were estimated among the pixels of the reference patch and the second patch having the number of <u>said at least one</u> rectangular regions therein that yielded the highest degree of correlation;

obtaining a plurality of intermediate synthesized frames by estimating the ~~aforementioned~~ correspondent relationships, obtaining the coordinate converted frames, calculating the plurality of correlative values, and comparing the degrees of correlation for all of the plurality of sampled frames; and

generating a synthesized frame by synthesizing the plurality of intermediate synthesized frames.

11. (currently amended): A method for synthesizing moving images, comprising the steps of:

sampling two consecutive frames from a moving image;

providing a reference patch having at least one rectangular region therein, in one of the two frames, which is designated as a reference frame;

providing a second patch, which is the same as the reference patch, in the other of the two frames;

moving and/or deforming the second patch in the other of the two frames so that an image within the second patch matches that within the reference image;

estimating correspondent relationships among ~~the~~ pixels within the second patch of the other frame and ~~the~~ pixels within the reference patch of the reference frame, based on the second patch after the movement and/or deformation thereof and the reference patch;

obtaining a coordinate converted frame, by coordinate converting the image within the second patch into a coordinate space of the reference frame, based on the correspondent relationships;

calculating a correlative value, which represents ~~the~~ a degree of correlation

between the images within the reference patch of the reference frame and the coordinate

converted frame;

increasing the number of said at least one rectangular regions within the reference

patch and the second patch in a stepwise manner, estimating the ~~aforementioned~~ correspondent

relationships, obtaining the coordinate converted frames, and calculating the correlative values

for each number of said at least one rectangular regions, until the degree of correlation is greater

than or equal to a predetermined threshold value; and

generating a synthesized frame having a higher resolution than either of the two

frames, by administering interpolation calculations on the images within the second patch and

the reference patch, based on the correspondent relationships, which were estimated among the

pixels of the reference patch and the second patch having the number of said at least one

rectangular regions therein that yielded the degree of correlation greater than or equal to the

threshold value.

12. (currently amended): A method for synthesizing moving images, comprising the

steps of:

sampling two consecutive frames from a moving image;

providing a reference patch having at least one rectangular region therein, in one

of the two frames, which is designated as a reference frame;

providing a second patch, which is the same as the reference patch, in the other of

the two frames;

moving and/or deforming the second patch in the other of the two frames so that

an image within the second patch matches that within the reference image;

estimating correspondent relationships among ~~the~~ pixels within the second patch

of the other frame and ~~the~~ pixels within the reference patch of the reference frame, based on the

second patch after the movement and/or deformation thereof and the reference patch;

obtaining a coordinate converted frame, by coordinate converting the image

within the second patch into a coordinate space of the reference frame, based on the

correspondent relationships;

calculating correlative values, which represent ~~the~~ a degree of correlation between

the images within the reference patch of the reference frame and the coordinate converted frame,

for each of the rectangular regions;

increasing the number of said at least one rectangular regions within the reference

patch and the second patch, in a stepwise manner, estimating the ~~aforementioned~~ correspondent

relationships, obtaining the coordinate converted frames, and calculating the correlative values

for each number of said at least one rectangular regions, until the degree of correlation or a

representative degree of correlation of all of ~~the~~ said at least one rectangular regions, or of said at

least one rectangular regions at predetermined positions from among all of ~~the~~ said at least one

rectangular regions, other than those for which the degree of correlation is less than a

predetermined value, or of a predetermined number of said at least one rectangular regions from

among all of ~~the~~ said at least one rectangular regions, other than those for which the degree of

correlation is less than a predetermined value, becomes greater than or equal to a predetermined

threshold value; and

generating a synthesized frame having a higher resolution than either of the two frames, by administering interpolation calculations on the images within the second patch and the reference patch for each region corresponding to ~~the~~ said at least one rectangular regions, based on the correspondent relationships, which were estimated among the pixels of the reference patch and the second patch having the number of said at least one rectangular regions therein that yielded the degree of correlation or the representative degree of correlation greater than or equal to the threshold value.

13. (currently amended): A method for synthesizing moving images, comprising the steps of:

sampling at least three consecutive frames from a moving image;

providing a reference patch having at least one rectangular region therein, in a first frame from among the at least three sampled frames, which is designated as a reference frame;

providing a second patch, which is the same as the reference patch, in another of the plurality of sampled frames;

moving and/or deforming the second patch in the other frame so that an image within the second patch matches that within the reference image;

estimating correspondent relationships among ~~the~~ pixels within the second patch of the other frame and ~~the~~ pixels within the reference patch of the reference frame, based on the second patch after the movement and/or deformation thereof and the reference patch;

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obtaining a coordinate converted frame, by coordinate converting the image within the second patch into a coordinate space of the reference frame, based on the correspondent relationships;

calculating a correlative value, which represents ~~the~~ a degree of correlation between the images within the reference patch of the reference frame and the coordinate converted frame;

increasing the number of said at least one rectangular regions within the reference patch and the second patch in a stepwise manner, estimating the ~~aforementioned~~ correspondent relationships, obtaining the coordinate converted frames, and calculating the correlative values for each number of said at least one rectangular regions, until the degree of correlation is greater than or equal to a predetermined threshold value;

obtaining an intermediate synthesized frame having a higher resolution than either the reference frame of the other frame, by administering interpolation calculations on the images within the second patch and the reference patch for each region corresponding to ~~the~~ said at least one rectangular regions, based on the correspondent relationships, which were estimated among the pixels of the reference patch and the second patch having the number of said at least one rectangular regions therein that yielded the degree of correlation greater than or equal to the threshold value;

obtaining a plurality of intermediate synthesized frames by estimating the ~~aforementioned~~ correspondent relationships, obtaining the coordinate converted frames, and calculating the plurality of correlative values, for all of the plurality of sampled frames; and

generating a synthesized frame by synthesizing the plurality of intermediate synthesized frames.

14. (currently amended): A method for synthesizing moving images, comprising the steps of:

sampling at least three consecutive frames from a moving image;

providing a reference patch having at least one rectangular region therein, in a first frame from among the at least three sampled frames, which is designated as a reference frame;

providing a second patch, which is the same as the reference patch, in another of the plurality of sampled frames;

moving and/or deforming the second patch in the other frame so that an image within the second patch matches that within the reference image;

estimating correspondent relationships among the pixels within the second patch of the other frame and the pixels within the reference patch of the reference frame, based on the second patch after the movement and/or deformation thereof and the reference patch;

obtaining a coordinate converted frame, by coordinate converting the image within the second patch into a coordinate space of the reference frame, based on the correspondent relationships;

calculating a correlative value, which represents the a degree of correlation between the images within the reference patch of the reference frame and the coordinate converted frame;

increasing the number of said at least one rectangular regions within the reference

patch and the second patch in a stepwise manner, estimating the ~~aforementioned~~ correspondent

relationships, obtaining the coordinate converted frames, and calculating the correlative values

for each number of said at least one rectangular regions, until the degree of correlation or a

representative degree of correlation of all of said at least one rectangular regions, or of said at

least one rectangular regions at predetermined positions from among all of ~~the~~ said at least one

rectangular regions, other than those for which the degree of correlation is less than a

predetermined value, or of a predetermined number of said at least one rectangular regions from

among all of ~~the~~ said at least one rectangular regions, other than those for which the degree of

correlation is less than a predetermined value, becomes greater than or equal to a predetermined

threshold value;

obtaining an intermediate synthesized frame having a higher resolution than either

the reference frame of the other frame, by administering interpolation calculations on the images

within the second patch and the reference patch for each region corresponding to ~~the~~ said at least

one rectangular regions, based on the correspondent relationships, which were estimated among

the pixels of the reference patch and the second patch having the number of said at least one

rectangular regions therein that yielded the degree of correlation or the representative degree of

correlation greater than or equal to the threshold value;

obtaining a plurality of intermediate synthesized frames by estimating the ~~aforementioned~~

correspondent relationships, obtaining the coordinate converted frames, and calculating the

plurality of correlative values, for all of the plurality of sampled frames; and

generating a synthesized frame by synthesizing the plurality of intermediate synthesized

frames.

15. (currently amended): A moving image synthesizing apparatus comprising:

a sampling means, for sampling two consecutive frames from a moving image;

a correspondent relationship estimating means, for: providing a reference patch

having at least one rectangular region therein, in one of the two frames, which is designated as a

reference frame;————providing a second patch, which is the same as the reference patch, in the

other of the two frames; moving and/or deforming the second patch in the other of the two

frames so that an image within the second patch matches that within the reference image; and

estimating correspondent relationships among the pixels within the second patch of the other

frame and the pixels within the reference patch of the reference frame, based on the second patch

after the movement and/or deformation thereof and the reference patch;

a coordinate converting means, for obtaining a coordinate converted frame, by

coordinate converting the image within the second patch into a coordinate space of the reference

frame, based on the correspondent relationships;

a correlative value calculating means, for calculating a correlative value, which

represents the a degree of correlation between the images within the reference patch of the

reference frame and the coordinate converted frame;

a control means, for controlling the correspondent relationship estimating means,

the coordinate converting means, and the correlative value calculating means, to increase the

number of said at least one rectangular regions within the reference patch and the second patch in

a stepwise manner, to estimate the ~~aforementioned~~ correspondent relationships, to obtain the

coordinate converted frames, and to calculate the correlative values for each number of <u>said at</u>

<u>least one</u> rectangular regions, until the degree of correlation is greater than or equal to a

predetermined threshold value; and

a synthesizing means, for generating a synthesized frame having a higher

resolution than either of the two frames, by administering interpolation calculations on the

images within the second patch and the reference patch, based on the correspondent

relationships, which were estimated among the pixels of the reference patch and the second patch

having the number of <u>said at least one</u> rectangular regions therein that yielded the degree of

correlation greater than or equal to the predetermined threshold value.

16. (currently amended): A moving image synthesizing apparatus comprising:

a sampling means, for sampling two consecutive frames from a moving image;

a correspondent relationship estimating means, for: providing a reference patch

having at least one rectangular region therein, in one of the two frames, which is designated as a

reference frame;_————providing a second patch, which is the same as the reference patch, in the

other of the two frames; moving and/or deforming the second patch in the other of the two

frames so that an image within the second patch matches that within the reference image; and

estimating correspondent relationships among ~~the~~ pixels within the second patch of the other

frame and ~~the~~ pixels within the reference patch of the reference frame, based on the second patch

after the movement and/or deformation thereof and the reference patch;

a coordinate converting means, for obtaining a coordinate converted frame, by

coordinate converting the image within the second patch into a coordinate space of the reference

frame, based on the correspondent relationships;

a correlative value calculating means, for calculating a correlative value, which

represents the a degree of correlation between the images within the reference patch of the

reference frame and the coordinate converted frame;

a control means, for controlling the correspondent relationship estimating means,

the coordinate converting means, and the correlative value calculating means, to increase the

number of said at least one rectangular regions within the reference patch and the second patch in

a stepwise manner, to estimate the aforementioned correspondent relationships, to obtain the

coordinate converted frames, and to calculate the correlative values for each number of said at

least one rectangular regions, until the degree of correlation or a representative degree of

correlation of all of said at least onethe rectangular regions, or of said at least one rectangular

regions at predetermined positions from among all of said at least onethe rectangular regions,

other than those for which the degree of correlation is less than a predetermined value, or of a

predetermined number of said at least one rectangular regions from among all of said at least

onethe rectangular regions, other than those for which the degree of correlation is less than a

predetermined value, becomes greater than or equal to a predetermined threshold value; and

a synthesizing means, for generating a synthesized frame having a higher

resolution than either of the two frames, by administering interpolation calculations on the

images within the second patch and the reference patch for each region corresponding to said at

least one rectangular regions, based on the correspondent relationships, which were estimated

among the pixels of the reference patch and the second patch having the number of <u>said at least</u> <u>one</u> rectangular regions therein that yielded the degree of correlation or the representative degree of correlation greater than or equal to the predetermined threshold value.

17. (original): A moving image synthesizing apparatus as defined in claim 15, wherein:

the control means decreases the threshold value, according to the increase in the number of rectangular regions, until the number of rectangular regions reaches a predetermined value, and increases the threshold value, when the number of rectangular regions exceeds the predetermined value.

18. (original): A moving image synthesizing apparatus as defined in claim 16, wherein:

the control means decreases the threshold value, according to the increase in the number of rectangular regions, until the number of rectangular regions reaches a predetermined value, and increases the threshold value, when the number of rectangular regions exceeds the predetermined value.

19. (original): A moving image synthesizing apparatus as defined in claim 15, wherein:

the correspondent relationship estimating means, the coordinate converting means, the correlative value calculating means, and the synthesizing means employ at least one component that constitutes the frames during the estimation of the correspondent relationships, the obtainment of the coordinate converted frames, the calculation of the correlative values, and the generation of the synthesized frame.

20. (original): A moving image synthesizing apparatus as defined in claim 16, wherein:

the correspondent relationship estimating means, the coordinate converting

means, the correlative value calculating means, and the synthesizing means employ at least one

component that constitutes the frames during the estimation of the correspondent relationships,

the obtainment of the coordinate converted frames, the calculation of the correlative values, and

the generation of the synthesized frame.

21. (currently amended): A moving image synthesizing apparatus, comprising:

a sampling means, for sampling at least three consecutive frames from a moving

image;

a correspondent relationship estimating means, for: providing a reference patch

having at least one rectangular region therein, in a first frame from among the at least three

sampled frames, which is designated as a reference frame; providing a second patch, which is the

same as the reference patch, in another of the plurality of sampled frames; moving and/or

deforming the second patch in the other frame so that an image within the second patch matches

that within the reference image; and estimating correspondent relationships among the pixels

within the second patch of the other frame and the pixels within the reference patch of the

reference frame, based on the second patch after the movement and/or deformation thereof and

the reference patch;

a coordinate converting means, for obtaining a coordinate converted frame, by

coordinate converting the image within the second patch into a coordinate space of the reference

frame, based on the correspondent relationships;

a correlative value calculating means, for calculating a correlative value, which

represents the a degree of correlation between the images within the reference patch of the

reference frame and the coordinate converted frame;

a control means, for controlling the correspondent relationship estimating means,

the coordinate converting means, and the correlative value calculating means, to increase the

number of said at least one rectangular regions within the reference patch and the second patch in

a stepwise manner, to estimate the aforementioned correspondent relationships, to obtain the

coordinate converted frames, and to calculate the correlative values for each number of said at

least one rectangular regions, until the degree of correlation is greater than or equal to a

predetermined threshold value; and

a synthesizing means, for: obtaining an intermediate synthesized frame having a

higher resolution than either the reference frame of the other frame, by: administering

interpolation calculations on the images within the second patch and the reference patch, based

on the correspondent relationships, which were estimated among the pixels of the reference patch

and the second patch having the number of said at least one rectangular regions therein that

yielded the degree of correlation greater than or equal to the threshold value; obtaining a

plurality of intermediate synthesized frames by estimating the aforementioned correspondent

relationships obtaining the coordinate converted frames, and calculating the plurality of

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correlative values, for all of the plurality of sampled frames; and generating a synthesized frame

by synthesizing the plurality of intermediate synthesized frames.

22. (currently amended): A moving image synthesizing apparatus, comprising:

a sampling means, for sampling at least three consecutive frames from a moving

image;

a correspondent relationship estimating means, for: providing a reference patch

having at least one rectangular region therein, in a first frame from among the at least three

sampled frames, which is designated as a reference frame; providing a second patch, which is the

same as the reference patch, in another of the plurality of sampled frames; moving and/or

deforming the second patch in the other frame so that an image within the second patch matches

that within the reference image; and estimating correspondent relationships among the pixels

within the second patch of the other frame and the pixels within the reference patch of the

reference frame, based on the second patch after the movement and/or deformation thereof and

the reference patch;

a coordinate converting means, for obtaining a coordinate converted frame, by

coordinate converting the image within the second patch into a coordinate space of the reference

frame, based on the correspondent relationships;

a correlative value calculating means, for calculating a correlative value, which

represents the a degree of correlation between the images within the reference patch of the

reference frame and the coordinate converted frame;

a control means, for controlling the correspondent relationship estimating means, the coordinate converting means, and the correlative value calculating means, to increase the number of said at least one rectangular regions within the reference patch and the second patch in a stepwise manner, to estimate the ~~aforementioned~~ correspondent relationships, to obtain the coordinate converted frames, and to calculate the correlative values for each number of said at least one rectangular regions, until the degree of correlation or a representative degree of correlation of all of said at least one~~the~~ rectangular regions, or of said at least one rectangular regions at predetermined positions from among all of said at least one~~the~~ rectangular regions, other than those for which the degree of correlation is less than a predetermined value, or of a predetermined number of said at least one rectangular regions from among all of said at least one~~the~~ rectangular regions, other than those for which the degree of correlation is less than a predetermined value, becomes greater than or equal to a predetermined threshold value; and

a synthesizing means, for: obtaining an intermediate synthesized frame having a higher resolution than either the reference frame of the other frame, by: administering interpolation calculations on the images within the second patch and the reference patch for each region corresponding to said at least one ~~the~~ rectangular regions, based on the correspondent relationships, which were estimated among the pixels of the reference patch and the second patch having the number of said at least one rectangular regions therein that yielded the degree of correlation or the representative degree of correlation greater than or equal to the threshold value; obtaining a plurality of intermediate synthesized frames by estimating the ~~aforementioned~~ correspondent relationships obtaining the coordinate converted frames, and calculating the

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plurality of correlative values, for all of the plurality of sampled frames; and generating a

synthesized frame by synthesizing the plurality of intermediate synthesized frames.

23. (original): A moving image synthesizing apparatus as defined in claim 21, wherein:

the control means decreases the threshold value, according to the increase in the

number of rectangular regions, until the number of rectangular regions reaches a predetermined

value, and increases the threshold value, according to the increase in the number of rectangular

regions, when the number of rectangular regions exceeds the predetermined value.

24. (original): A moving image synthesizing apparatus as defined in claim 22, wherein:

the control means decreases the threshold value, according to the increase in the

number of rectangular regions, until the number of rectangular regions reaches a predetermined

value, and increases the threshold value, according to the increase in the number of rectangular

regions, when the number of rectangular regions exceeds the predetermined value.

25. (original): A moving image synthesizing apparatus as defined in claim 21, wherein:

the correspondent relationship estimating means, the coordinate converting

means, the correlative value calculating means, and the synthesizing means employ at least one

component that constitutes the frames during the estimation of the correspondent relationships,

the obtainment of the coordinate converted frames, the calculation of the correlative values, the

generation of the intermediate synthesized frames, and the generation of the synthesized frame.

26. (original): A moving image synthesizing apparatus as defined in claim 22, wherein:

the correspondent relationship estimating means, the coordinate converting

means, the correlative value calculating means, and the synthesizing means employ at least one

component that constitutes the frames during the estimation of the correspondent relationships,

the obtainment of the coordinate converted frames, the calculation of the correlative values, the

generation of the intermediate synthesized frames, and the generation of the synthesized frame.

27. (currently amended): A recording medium having embodied thereon Aa program

that causes a computer to execute a method for synthesizing moving images, comprising the

procedures of:

sampling two consecutive frames from a moving image;

providing a reference patch having at least one rectangular region therein, in one

of the two frames, which is designated as a reference frame;

providing a second patch, which is the same as the reference patch, in the other of

the two frames;

moving and/or deforming the second patch in the other of the two frames so that

an image within the second patch matches that within the reference image;

estimating correspondent relationships among the pixels within the second patch

of the other frame and the pixels within the reference patch of the reference frame, based on the

second patch after the movement and/or deformation thereof and the reference patch;

obtaining a coordinate converted frame, by coordinate converting the image

within the second patch into a coordinate space of the reference frame, based on the

correspondent relationships;

calculating a correlative value, which represents ~~the~~ a degree of correlation

between the images within the reference patch of the reference frame and the coordinate

converted frame;

increasing the number of said at least one rectangular regions within the reference

patch and the second patch in a stepwise manner, estimating the ~~aforementioned~~ correspondent

relationships, obtaining the coordinate converted frames, and calculating the correlative values

for each number of said at least one rectangular regions, until the degree of correlation is greater

than or equal to a predetermined threshold value; and

generating a synthesized frame having a higher resolution than either of the two

frames, by administering interpolation calculations on the images within the second patch and

the reference patch, based on the correspondent relationships, which were estimated among the

pixels of the reference patch and the second patch having the number of said at least one

rectangular regions therein that yielded the degree of correlation greater than or equal to the

threshold value.

28. (currently amended): A recording medium having embodied thereon ~~A~~ a program

that causes a computer to execute a method for synthesizing moving images, comprising the

procedures of:

sampling two consecutive frames from a moving image;

providing a reference patch having at least one rectangular region therein, in one

of the two frames, which is designated as a reference frame;

providing a second patch, which is the same as the reference patch, in the other of

the two frames;

moving and/or deforming the second patch in the other of the two frames so that

an image within the second patch matches that within the reference image;

estimating correspondent relationships among ~~the~~ pixels within the second patch

of the other frame and ~~the~~ pixels within the reference patch of the reference frame, based on the

second patch after the movement and/or deformation thereof and the reference patch;

obtaining a coordinate converted frame, by coordinate converting the image

within the second patch into a coordinate space of the reference frame, based on the

correspondent relationships;

calculating correlative values, which represent ~~the~~ a degree of correlation between

the images within the reference patch of the reference frame and the coordinate converted frame,

for each of the rectangular regions;

increasing the number of said at least one rectangular regions within the reference

patch and the second patch, in a stepwise manner, estimating the ~~aforementioned~~ correspondent

relationships, obtaining the coordinate converted frames, and calculating the correlative values

for each number of said at least one rectangular regions, until the degree of correlation or a

representative degree of correlation of all of said at least one ~~the~~ rectangular regions, or of said at

least one rectangular regions at predetermined positions from among all of said at least one ~~the~~

rectangular regions, other than those for which the degree of correlation is less than a

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predetermined value, or of a predetermined number of said at least one rectangular regions from

among all of said at least one the-rectangular regions, other than those for which the degree of

correlation is less than a predetermined value, becomes greater than or equal to a predetermined

threshold value; and

generating a synthesized frame having a higher resolution than either of the two

frames, by administering interpolation calculations on the images within the second patch and

the reference patch for each region corresponding to said at least onethe rectangular regions,

based on the correspondent relationships, which were estimated among the pixels of the

reference patch and the second patch having the number of said at least one rectangular regions

therein that yielded the degree of correlation or the representative degree of correlation greater

than or equal to the threshold value.

29. (currently amended): A recording medium having embodied thereon Aa program

that causes a computer to execute a method for synthesizing moving images, comprising the

procedures of:

sampling at least three consecutive frames from a moving image;

providing a reference patch having at least one rectangular region therein, in a

first frame from among the at least three sampled frames, which is designated as a reference

frame;

providing a second patch, which is the same as the reference patch, in another of

the plurality of sampled frames;

moving and/or deforming the second patch in the other frame so that an image within the second patch matches that within the reference image;

estimating correspondent relationships among ~~the~~ pixels within the second patch of the other frame and ~~the~~ pixels within the reference patch of the reference frame, based on the second patch after the movement and/or deformation thereof and the reference patch;

obtaining a coordinate converted frame, by coordinate converting the image within the second patch into a coordinate space of the reference frame, based on the correspondent relationships;

calculating a correlative value, which represents ~~the~~ a degree of correlation between the images within the reference patch of the reference frame and the coordinate converted frame;

increasing the number of <u>said at least one</u> rectangular regions within the reference patch and the second patch in a stepwise manner, estimating the ~~aforementioned~~ correspondent relationships, obtaining the coordinate converted frames, and calculating the correlative values for each number of <u>said at least one</u> rectangular regions, until the degree of correlation is greater than or equal to a predetermined threshold value;

obtaining an intermediate synthesized frame having a higher resolution than either the reference frame of the other frame, by administering interpolation calculations on the images within the second patch and the reference patch, based on the correspondent relationships, which were estimated among the pixels of the reference patch and the second patch having the number of <u>said at least one</u> rectangular regions therein that yielded the degree of correlation greater than or equal to the threshold value;

obtaining a plurality of intermediate synthesized frames by estimating the

~~aforementioned~~ correspondent relationships, obtaining the coordinate converted frames, and

calculating the plurality of correlative values, for all of the plurality of sampled frames; and

generating a synthesized frame by synthesizing the plurality of intermediate

synthesized frames.

30. (currently amended): <u>A recording medium having embodied thereon A</u>a program

that causes a computer to execute a method for synthesizing moving images, comprising the

procedures of:

sampling at least three consecutive frames from a moving image;

providing a reference patch having at least one rectangular region therein, in a

first frame from among the at least three sampled frames, which is designated as a reference

frame;

providing a second patch, which is the same as the reference patch, in another of

the plurality of sampled frames;

moving and/or deforming the second patch in the other frame so that an image

within the second patch matches that within the reference image;

estimating correspondent relationships among ~~the~~ pixels within the second patch

of the other frame and ~~the~~ pixels within the reference patch of the reference frame, based on the

second patch after the movement and/or deformation thereof and the reference patch;

obtaining a coordinate converted frame, by coordinate converting the image

within the second patch into a coordinate space of the reference frame, based on the

correspondent relationships;

calculating a correlative value, which represents ~~the~~ a degree of correlation

between the images within the reference patch of the reference frame and the coordinate

converted frame;

increasing the number of said at least one rectangular regions within the reference

patch and the second patch in a stepwise manner, estimating the ~~aforementioned~~ correspondent

relationships, obtaining the coordinate converted frames, and calculating the correlative values

for each number of said at least one rectangular regions, until the degree of correlation or a

representative degree of correlation of all of said at least one ~~the~~ rectangular regions, or of said at

least one rectangular regions at predetermined positions from among all of said at least one~~the~~

rectangular regions, other than those for which the degree of correlation is less than a

predetermined value, or of a predetermined number of said at least one rectangular regions from

among all of said at least one ~~the~~ rectangular regions, other than those for which the degree of

correlation is less than a predetermined value, becomes greater than or equal to a predetermined

threshold value;

obtaining an intermediate synthesized frame having a higher resolution than either

the reference frame of the other frame, by administering interpolation calculations on the images

within the second patch and the reference patch for each region corresponding to said at least one

rectangular regions, based on the correspondent relationships, which were estimated among the

pixels of the reference patch and the second patch having the number of said at least one

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rectangular regions therein that yielded the degree of correlation or the representative degree of correlation greater than or equal to the threshold value;

obtaining a plurality of intermediate synthesized frames by estimating the ~~aforementioned~~ correspondent relationships, obtaining the coordinate converted frames, and calculating the plurality of correlative values, for all of the plurality of sampled frames; and

generating a synthesized frame by synthesizing the plurality of intermediate synthesized frames.

31. (currently amended): A method for synthesizing moving images, comprising the steps of:

sampling two consecutive frames from a moving image;

providing a reference patch having at least one rectangular region therein, in one of the two frames, which is designated as a reference frame;

providing a second patch, which is the same as the reference patch, in the other of the two frames;

moving and/or deforming the second patch in the other of the two frames so that an image within the second patch matches that within the reference image;

estimating correspondent relationships among ~~the~~ pixels within the second patch of the other frame and ~~the~~ pixels within the reference patch of the reference frame, based on the second patch after the movement and/or deformation thereof and the reference patch;

obtaining a coordinate converted frame, by coordinate converting the image

within the second patch into a coordinate space of the reference frame, based on the

correspondent relationships;

calculating a first correlative value, which represents ~~the~~ a degree of correlation

between the images within the reference patch of the reference frame and the coordinate

converted frame;

increasing the number of said at least one rectangular regions within the reference

patch and the second patch in a stepwise manner by one step, estimating the ~~aforementioned~~

correspondent relationships, obtaining the coordinate converted frames, and calculating the

correlative value, thereby obtaining a second correlative value;

calculating the variation between the first and second correlative values;

increasing the number of said at least one rectangular regions within the reference

patch and the second patch in a stepwise manner an additional step, estimating the

~~aforementioned~~ correspondent relationships, obtaining the coordinate converted frames,

calculating the first and second correlative values, and calculating the variation between the first

and second correlative values of consecutive steps, until the variation becomes less than or equal

to a predetermined threshold value; and

generating a synthesized frame having a higher resolution than either of the two

frames, by administering interpolation calculations on the images within the second patch and

the reference patch, based on the correspondent relationships, which were estimated among the

pixels of either of the reference patches and the second patches having the number of said at least

one rectangular regions therein that yielded the variation less than or equal to the threshold value.

32. (currently amended): A method for synthesizing moving images, comprising the steps of:

sampling two consecutive frames from a moving image;

providing a reference patch having at least one rectangular region therein, in one of the two frames, which is designated as a reference frame;

providing a second patch, which is the same as the reference patch, in the other of the two frames;

moving and/or deforming the second patch in the other of the two frames so that an image within the second patch matches that within the reference image;

estimating correspondent relationships among the pixels within the second patch of the other frame and the pixels within the reference patch of the reference frame, based on the second patch after the movement and/or deformation thereof and the reference patch;

obtaining a coordinate converted frame, by coordinate converting the image within the second patch into a coordinate space of the reference frame, based on the correspondent relationships;

calculating a first correlative value, which represents the a degree of correlation between the images within the reference patch of the reference frame and the coordinate converted frame, for each of the rectangular regions;

increasing the number of said at least one rectangular regions within the reference patch and the second patch in a stepwise manner by one step, estimating the aforementioned

correspondent relationships, obtaining the coordinate converted frames, and calculating the

correlative value, thereby obtaining a second correlative value;

calculating the variation between the first and second correlative values for each

of the rectangular regions;

increasing the number of said at least one rectangular regions within the reference

patch and the second patch in a stepwise manner an additional step, estimating the

aforementioned correspondent relationships, obtaining the coordinate converted frames,

calculating the first and second correlative values, and calculating the variation between the first

and second correlative values of consecutive steps, until the variation or a representative

variation of all of said at least one the rectangular regions, or of said at least one rectangular

regions at predetermined positions from among all of said at least onethe rectangular regions,

other than those for which the variation is greater than or equal to a predetermined value, or of a

predetermined number of said at least one rectangular regions from among all of said at least

onethe rectangular regions, other than those for which the variation is greater than or equal to a

predetermined value, becomes less than or equal to a predetermined threshold value; and

generating a synthesized frame having a higher resolution than either of the two

frames, by administering interpolation calculations on the images within the second patch and

the reference patch for each region corresponding to said at least onethe rectangular regions,

based on the correspondent relationships, which were estimated among the pixels of either of the

reference patches and the second patches having the number of said at least one rectangular

regions therein that yielded the variation or the representative variation less than or equal to the

threshold value.

33. (currently amended): A method for synthesizing moving images, comprising the

steps of:

sampling at least three consecutive frames from a moving image;

providing a reference patch having at least one rectangular region therein, in a

first frame from among the at least three sampled frames, which is designated as a reference

frame;

providing a second patch, which is the same as the reference patch, in another of

the plurality of sampled frames;

moving and/or deforming the second patch in the other frame so that an image

within the second patch matches that within the reference image;

estimating correspondent relationships among the pixels within the second patch

of the other frame and the pixels within the reference patch of the reference frame, based on the

second patch after the movement and/or deformation thereof and the reference patch;

obtaining a coordinate converted frame, by coordinate converting the image

within the second patch into a coordinate space of the reference frame, based on the

correspondent relationships;

calculating a first correlative value, which represents the a degree of correlation

between the images within the reference patch of the reference frame and the coordinate

converted frame;

increasing the number of said at least one rectangular regions within the reference

patch and the second patch in a stepwise manner by one step, estimating the aforementioned

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correspondent relationships, obtaining the coordinate converted frames, and calculating the correlative value, thereby obtaining a second correlative value;

calculating the variation between the first and second correlative values;

increasing the number of said at least one rectangular regions within the reference patch and the second patch in a stepwise manner an additional step, estimating the aforementioned correspondent relationships, obtaining the coordinate converted frames, calculating the first and second correlative values, and calculating the variation between the first and second correlative values of consecutive steps, until the variation becomes less than or equal to a predetermined threshold value;

obtaining an intermediate synthesized frame having a higher resolution than either the reference frame of the other frame, by administering interpolation calculations on the images within the second patch and the reference patch, based on the correspondent relationships, which were estimated among the pixels of the reference patch and the second patch having the number of said at least one rectangular regions therein that yielded the variation less than or equal to the threshold value;

obtaining a plurality of intermediate synthesized frames by estimating the aforementioned correspondent relationships, obtaining the coordinate converted frames, calculating the plurality of correlative values, and calculating the variations among the plurality of the correlative values, for all of the plurality of sampled frames; and

generating a synthesized frame by synthesizing the plurality of intermediate synthesized frames.

34. (currently amended): A method for synthesizing moving images, comprising the steps of:

sampling at least three consecutive frames from a moving image;

providing a reference patch having at least one rectangular region therein, in a first frame from among the at least three sampled frames, which is designated as a reference frame;

providing a second patch, which is the same as the reference patch, in another of the plurality of sampled frames;

moving and/or deforming the second patch in the other frame so that an image within the second patch matches that within the reference image;

estimating correspondent relationships among the pixels within the second patch of the other frame and the pixels within the reference patch of the reference frame, based on the second patch after the movement and/or deformation thereof and the reference patch;

obtaining a coordinate converted frame, by coordinate converting the image within the second patch into a coordinate space of the reference frame, based on the correspondent relationships;

calculating a first correlative value, which represents the a degree of correlation between the images within the reference patch of the reference frame and the coordinate converted frame, for each of the rectangular regions;

increasing the number of said at least one rectangular regions within the reference patch and the second patch in a stepwise manner by one step, estimating the aforementioned

correspondent relationships, obtaining the coordinate converted frames, and calculating the

correlative value, thereby obtaining a second correlative value;

calculating the variation between the first and second correlative values for each

of the rectangular regions;

increasing the number of said at least one rectangular regions within the reference patch

and the second patch in a stepwise manner an additional step, estimating the ~~aforementioned~~

correspondent relationships, obtaining the coordinate converted frames, calculating the first and

second correlative values, and calculating the variation between the first and second correlative

values of consecutive steps, until the variation or a representative variation of all of said at least

one~~the~~ rectangular regions, or of said at least one~~the~~ rectangular regions at predetermined

positions from among all of said at least one~~the~~ rectangular regions, other than those for which

the variation is greater than or equal to a predetermined value, or of a predetermined number of

said at least one rectangular regions from among all of said at least one~~the~~ rectangular regions,

other than those for which the variation is greater than or equal to a predetermined value,

becomes less than or equal to a predetermined threshold value;

obtaining an intermediate synthesized frame having a higher resolution than either

the reference frame of the other frame, by administering interpolation calculations on the images

within the second patch and the reference patch for each region corresponding to said at least one

~~the~~-rectangular regions, based on the correspondent relationships, which were estimated among

the pixels of the reference patch and the second patch having the number of said at least one

rectangular regions therein that yielded the variation or the representative variation less than or

equal to the threshold value;

obtaining a plurality of intermediate synthesized frames by estimating the

~~aforementioned~~ correspondent relationships, obtaining the coordinate converted frames,

calculating the plurality of correlative values, and calculating the variations among the plurality

of the correlative values, for all of the plurality of sampled frames; and

generating a synthesized frame by synthesizing the plurality of intermediate

synthesized frames.

35. (currently amended): A moving image synthesizing apparatus, comprising:

a sampling means, for sampling two consecutive frames from a moving image;

a correspondent relationship estimating means, for: providing a reference patch

having at least one rectangular region therein, in one of the two frames, which is designated as a

reference frame; providing a second patch, which is the same as the reference patch, in the other

of the two frames; moving and/or deforming the second patch in the other of the two frames so

that an image within the second patch matches that within the reference image; and estimating

correspondent relationships among ~~the~~ pixels within the second patch of the other frame and ~~the~~

pixels within the reference patch of the reference frame, based on the second patch after the

movement and/or deformation thereof and the reference patch;

a coordinate converting means, for obtaining a coordinate converted frame, by

coordinate converting the image within the second patch into a coordinate space of the reference

frame, based on the correspondent relationships;

a correlative value calculating means, for calculating a first correlative value,

which represents the a degree of correlation between the images within the reference patch of the

reference frame and the coordinate converted frame;

a control means, for controlling the correspondent relationship estimating means,

the coordinate converting means, and the correlative value calculating means, to increase the

number of said at least one rectangular regions within the reference patch and the second patch in

a stepwise manner by one step, to estimate the aforementioned correspondent relationships, to

obtain the coordinate converted frames, and to calculate the correlative value, thereby obtaining

a second correlative value;

a variation calculating means, for calculating the variation between the first and

second correlative values;

a comparing means, for controlling the correspondent relationship estimating

means, the coordinate converting means, the correlative relationship calculating means, and the

variation calculating means, to increase the number of said at least one rectangular regions

within the reference patch and the second patch in a stepwise manner an additional step, to

estimate the aforementioned correspondent relationships, to obtain the coordinate converted

frames, to calculate the first and second correlative values, and to calculate the variation between

the first and second correlative values of consecutive steps, until the variation becomes less than

or equal to a predetermined threshold value; and

a synthesizing means, for generating a synthesized frame having a higher

resolution than either of the two frames, by administering interpolation calculations on the

images within the second patch and the reference patch, based on the correspondent

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relationships, which were estimated among the pixels of either of the reference patches and the

second patches having the number of <u>said at least one</u> rectangular regions therein that yielded the

variation less than or equal to the threshold value.

36. (currently amended): A moving image synthesizing apparatus, comprising:

a sampling means, for sampling two consecutive frames from a moving image;

a correspondent relationship estimating means, for: providing a reference patch

having at least one rectangular region therein, in one of the two frames, which is designated as a

reference frame; providing a second patch, which is the same as the reference patch, in the other

of the two frames; moving and/or deforming the second patch in the other of the two frames so

that an image within the second patch matches that within the reference image; and estimating

correspondent relationships among ~~the~~ pixels within the second patch of the other frame and ~~the~~

pixels within the reference patch of the reference frame, based on the second patch after the

movement and/or deformation thereof and the reference patch;

a coordinate converting means, for obtaining a coordinate converted frame, by

coordinate converting the image within the second patch into a coordinate space of the reference

frame, based on the correspondent relationships;

a correlative value calculating means, for calculating a first correlative value,

which represents ~~the~~-<u>a</u> degree of correlation between the images within the reference patch of the

reference frame and the coordinate converted frame, for each of the rectangular regions;

a control means, for controlling the correspondent relationship estimating means,

the coordinate converting means, and the correlative value calculating means, to increase the

number of said at least one rectangular regions within the reference patch and the second patch in

a stepwise manner by one step, to estimate the ~~aforementioned~~ correspondent relationships, to

obtain the coordinate converted frames, and to calculate the correlative value, thereby obtaining

a second correlative value;

a variation calculating means, for calculating the variation between the first and

second correlative values for each of the rectangular regions;

a comparing means, for controlling the correspondent relationship estimating

means, the coordinate converting means, the correlative relationship calculating means, and the

variation calculating means, to increase the number of said at least one rectangular regions

within the reference patch and the second patch in a stepwise manner an additional step, to

estimate the ~~aforementioned~~ correspondent relationships, to obtain the coordinate converted

frames, to calculate the first and second correlative values, and to calculate the variation between

the first and second correlative values of consecutive steps, until the variation or a representative

variation of all of ~~the~~ said at least one rectangular regions, or of said at least one~~the~~ rectangular

regions at predetermined positions from among all of the said at least one rectangular regions,

other than those for which the variation is greater than or equal to a predetermined value, or of a

predetermined number of said at least one rectangular regions from among all of ~~the~~ said at least

one rectangular regions, other than those for which the variation is greater than or equal to a

predetermined value, becomes less than or equal to a predetermined threshold value; and

a synthesizing means, for generating a synthesized frame having a higher

resolution than either of the two frames, by administering interpolation calculations on the

images within the second patch and the reference patch for each region corresponding to said at

least one~~the~~ rectangular regions, based on the correspondent relationships, which were estimated among the pixels of either of the reference patches and the second patches having the number of said at least one rectangular regions therein that yielded the variation or the representative variation less than or equal to the threshold value.

37. (original): A moving image synthesizing apparatus as defined in claim 35, wherein:

the control means sets the predetermined threshold value to be larger, according to the increase in the number of rectangular regions, when the number of rectangular regions exceeds a predetermined value.

38. (original): A moving image synthesizing apparatus as defined in claim 36, wherein:

the control means sets the predetermined threshold value to be larger, according to the increase in the number of rectangular regions, when the number of rectangular regions exceeds a predetermined value.

39. (original): A moving image synthesizing apparatus as defined in claim 35, wherein:

the correspondent relationship estimating means, the coordinate converting means, the correlative value calculating means, the control means, the variation calculating means, the comparing means, and the synthesizing means employ at least one component that constitutes the frames during the estimation of the correspondent relationships, the obtainment of the coordinate converted frames, the calculation of the correlative values, the calculation of the variations, and the generation of the synthesized frame.

40. (original): A moving image synthesizing apparatus as defined in claim 36, wherein:

the correspondent relationship estimating means, the coordinate converting means, the correlative value calculating means, the control means, the variation calculating means, the comparing means, and the synthesizing means employ at least one component that constitutes the frames during the estimation of the correspondent relationships, the obtainment of the coordinate converted frames, the calculation of the correlative values, the calculation of the variations, and the generation of the synthesized frame.

41. (currently amended): A moving image synthesizing apparatus, comprising:

a sampling means, for sampling at least three consecutive frames from a moving image;

a correspondent relationship estimating means, for: providing a reference patch having at least one rectangular region therein, in a first frame from among the at least three sampled frames, which is designated as a reference frame; providing a second patch, which is the same as the reference patch, in another of the plurality of sampled frames; moving and/or deforming the second patch in the other frame so that an image within the second patch matches that within the reference image; and estimating correspondent relationships among the pixels within the second patch of the other frame and the pixels within the reference patch of the reference frame, based on the second patch after the movement and/or deformation thereof and the reference patch;

a coordinate converting means, for obtaining a coordinate converted frame, by coordinate converting the image within the second patch into a coordinate space of the reference frame, based on the correspondent relationships;

a correlative value calculating means, for calculating a first correlative value, which represents the a degree of correlation between the images within the reference patch of the reference frame and the coordinate converted frame;

a control means, for controlling the correspondent relationship estimating means, the coordinate converting means, and the correlative value calculating means, to increase the a number of said at least one rectangular regions within the reference patch and the second patch in a stepwise manner by one step, to estimate the aforementioned correspondent relationships, to obtain the coordinate converted frames, and to calculate the correlative value, thereby obtaining a second correlative value;

a variation calculating means, for calculating the variation between the first and second correlative values;

a comparing means, for controlling the correspondent relationship estimating means, the coordinate converting means, the correlative value calculating means, and the variation calculating means, to increase the number of said at least one rectangular regions within the reference patch and the second patch in a stepwise manner an additional step, to estimate the aforementioned correspondent relationships, to obtain the coordinate converted frames, to calculate the first and second correlative values, and to calculate the variation between the first and second correlative values of consecutive steps, until the variation becomes less than or equal to a predetermined threshold value; and

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a synthesizing means, for: obtaining an intermediate synthesized frame having a

higher resolution than either the reference frame of the other frame, by administering

interpolation calculations on the images within the second patch and the reference patch, based

on the correspondent relationships, which were estimated among the pixels of the reference patch

and the second patch having the number of said at least one rectangular regions therein that

yielded the variation less than or equal to the threshold value; obtaining a plurality of

intermediate synthesized frames by estimating the aforementioned correspondent relationships,

obtaining the coordinate converted frames, calculating the plurality of correlative values, and

calculating the variations among the plurality of the correlative values, for all of the plurality of

sampled frames; and generating a synthesized frame by synthesizing the plurality of intermediate

synthesized frames.

42. (currently amended): A moving image synthesizing apparatus, comprising:

a sampling means, for sampling at least three consecutive frames from a moving

image;

a correspondent relationship estimating means, for: providing a reference patch

having at least one rectangular region therein, in a first frame from among the at least three

sampled frames, which is designated as a reference frame; providing a second patch, which is the

same as the reference patch, in another of the plurality of sampled frames; moving and/or

deforming the second patch in the other frame so that an image within the second patch matches

that within the reference image; and estimating correspondent relationships among the pixels

within the second patch of the other frame and the pixels within the reference patch of the

reference frame, based on the second patch after the movement and/or deformation thereof and

the reference patch;

a coordinate converting means, for obtaining a coordinate converted frame, by

coordinate converting the image within the second patch into a coordinate space of the reference

frame, based on the correspondent relationships;

a correlative value calculating means, for calculating a first correlative value,

which represents the a degree of correlation between the images within the reference patch of the

reference frame and the coordinate converted frame, for each of the rectangular regions;

a control means, for controlling the correspondent relationship estimating means,

the coordinate converting means, and the correlative value calculating means, to increase the a

number of rectangular regions within the reference patch and the second patch in a stepwise

manner by one step, to estimate the aforementioned correspondent relationships, to obtain the

coordinate converted frames, and to calculate the correlative value, thereby obtaining a second

correlative value;

a variation calculating means, for calculating the variation between the first and

second correlative values for each of the rectangular regions;

a comparing means, for controlling the correspondent relationship estimating means, the

coordinate converting means, the correlative value calculating means, and the variation

calculating means, to increase the number of said at least one rectangular regions within the

reference patch and the second patch in a stepwise manner an additional step, to estimate the

aforementioned correspondent relationships, to obtain the coordinate converted frames, to

calculate the first and second correlative values, and to calculate the variation between the first

and second correlative values of consecutive steps, until the variation of all of said at least one~~the~~

rectangular regions, or of said at least one~~the~~ rectangular regions at predetermined positions from

among all of said at least one~~the~~ rectangular regions, other than those for which the variation is

greater than or equal to a predetermined value, or of a predetermined number of said at least one

rectangular regions from among all of said at least one~~the~~ rectangular regions, other than those

for which the variation is greater than or equal to a predetermined value, becomes less than or

equal to a predetermined threshold value; and

  a synthesizing means, for: obtaining an intermediate synthesized frame having a

higher resolution than either the reference frame of the other frame, by administering

interpolation calculations on the images within the second patch and the reference patch, based

on the correspondent relationships, which were estimated among the pixels of the reference patch

and the second patch having the number of said at least one rectangular regions therein that

yielded the variation or the representative variation less than or equal to the threshold value;

obtaining a plurality of intermediate synthesized frames by estimating the ~~aforementioned~~

correspondent relationships, obtaining the coordinate converted frames, calculating the plurality

of correlative values, and calculating the variations among the plurality of the correlative values,

for all of the plurality of sampled frames; and generating a synthesized frame by synthesizing the

plurality of intermediate synthesized frames.

  43. (original): A moving image synthesizing apparatus as defined in claim 41, wherein:

the control means sets the predetermined threshold value to be larger, according

to the increase in the number of rectangular regions, when the number of rectangular regions

exceeds a predetermined value.

44. (original): A moving image synthesizing apparatus as defined in claim 42, wherein:

the control means sets the predetermined threshold value to be larger, according

to the increase in the number of rectangular regions, when the number of rectangular regions

exceeds a predetermined value.

45. (original): A moving image synthesizing apparatus as defined in claim 41, wherein:

the correspondent relationship estimating means, the coordinate converting

means, the correlative value calculating means, the control means, the variation calculating

means, the comparing means, and the synthesizing means employ at least one component that

constitutes the frames during the estimation of the correspondent relationships, the obtainment of

the coordinate converted frames, the calculation of the correlative values, the calculation of the

variations, the generation of the intermediate synthesized frames, and the generation of the

synthesized frame.

46. (original): A moving image synthesizing apparatus as defined in claim 42, wherein:

the correspondent relationship estimating means, the coordinate converting

means, the correlative value calculating means, the control means, the variation calculating

means, the comparing means, and the synthesizing means employ at least one component that

constitutes the frames during the estimation of the correspondent relationships, the obtainment of

the coordinate converted frames, the calculation of the correlative values, the calculation of the

variations, the generation of the intermediate synthesized frames, and the generation of the

synthesized frame.

47. (currently amended): A recording medium having embodied thereon Aa program

that causes a computer to execute a method for synthesizing moving images, comprising the

procedures of:

sampling two consecutive frames from a moving image;

providing a reference patch having at least one rectangular region therein, in one

of the two frames, which is designated as a reference frame;

providing a second patch, which is the same as the reference patch, in the other of

the two frames;

moving and/or deforming the second patch in the other of the two frames so that

an image within the second patch matches that within the reference image;

estimating correspondent relationships among the-pixels within the second patch

of the other frame and the-pixels within the reference patch of the reference frame, based on the

second patch after the movement and/or deformation thereof and the reference patch;

obtaining a coordinate converted frame, by coordinate converting the image

within the second patch into a coordinate space of the reference frame, based on the

correspondent relationships;

calculating a first correlative value, which represents ~~the~~ a degree of correlation between the images within the reference patch of the reference frame and the coordinate converted frame;

increasing the number of said at least one rectangular regions within the reference patch and the second patch in a stepwise manner by one step, estimating the ~~aforementioned~~ correspondent relationships, obtaining the coordinate converted frames, and calculating the correlative value, thereby obtaining a second correlative value;

calculating the variation between the first and second correlative values;

increasing the number of said at least one rectangular regions within the reference patch and the second patch in a stepwise manner an additional step, estimating the ~~aforementioned~~ correspondent relationships, obtaining the coordinate converted frames, calculating the first and second correlative values, and calculating the variation between the first and second correlative values of consecutive steps, until the variation becomes less than or equal to a predetermined threshold value; and

generating a synthesized frame having a higher resolution than either of the two frames, by administering interpolation calculations on the images within the second patch and the reference patch, based on the correspondent relationships, which were estimated among the pixels of either of the reference patches and the second patches having the number of said at least one rectangular regions therein that yielded the variation less than or equal to the threshold value.

48. (currently amended): A recording medium having embodied thereon Aa program

that causes a computer to execute a method for synthesizing moving images, comprising the

procedures of:

sampling two consecutive frames from a moving image;

providing a reference patch having at least one rectangular region therein, in one

of the two frames, which is designated as a reference frame;

providing a second patch, which is the same as the reference patch, in the other of

the two frames;

moving and/or deforming the second patch in the other of the two frames so that

an image within the second patch matches that within the reference image;

estimating correspondent relationships among the pixels within the second patch

of the other frame and the pixels within the reference patch of the reference frame, based on the

second patch after the movement and/or deformation thereof and the reference patch;

obtaining a coordinate converted frame, by coordinate converting the image

within the second patch into a coordinate space of the reference frame, based on the

correspondent relationships;

calculating a first correlative value, which represents the a degree of correlation

between the images within the reference patch of the reference frame and the coordinate

converted frame, for each of said at least onethe rectangular regions;

increasing the number of said at least one rectangular regions within the reference

patch and the second patch in a stepwise manner by one step, estimating the aforementioned

correspondent relationships, obtaining the coordinate converted frames, and calculating the

correlative value, thereby obtaining a second correlative value;

calculating the variation between the first and second correlative values for each

of said at least onethe rectangular regions;

increasing the number of said at least one rectangular regions within the reference

patch and the second patch in a stepwise manner an additional step, estimating the

aforementioned correspondent relationships, obtaining the coordinate converted frames,

calculating the first and second correlative values, and calculating the variation between the first

and second correlative values of consecutive steps, until the variation or a representative

variation of all of said at least onethe rectangular regions, or of said at least onethe rectangular

regions at predetermined positions from among all of said at least onethe rectangular regions,

other than those for which the variation is greater than or equal to a predetermined value, or of a

predetermined number of said at least one rectangular regions from among all of said at least

onethe rectangular regions, other than those for which the variation is greater than or equal to a

predetermined value, becomes less than or equal to a predetermined threshold value; and

generating a synthesized frame having a higher resolution than either of the two

frames, by administering interpolation calculations on the images within the second patch and

the reference patch for each region corresponding to the rectangular regions, based on the

correspondent relationships, which were estimated among the pixels of either of the reference

patches and the second patches having the number of said at least one rectangular regions therein

that yielded the variation or the representative variation less than or equal to the threshold value.

49. (currently amended): <u>A recording medium having embodied thereon</u> ~~A~~a program

that causes a computer to execute a method for synthesizing moving images, comprising the

procedures of:

sampling at least three consecutive frames from a moving image;

providing a reference patch having at least one rectangular region therein, in a

first frame from among the at least three sampled frames, which is designated as a reference

frame;

providing a second patch, which is the same as the reference patch, in another of

the plurality of sampled frames;

moving and/or deforming the second patch in the other frame so that an image

within the second patch matches that within the reference image~~;z~~;

estimating correspondent relationships among ~~the~~ pixels within the second patch

of the other frame and ~~the~~ pixels within the reference patch of the reference frame, based on the

second patch after the movement and/or deformation thereof and the reference patch;

obtaining a coordinate converted frame, by coordinate converting the image

within the second patch into a coordinate space of the reference frame, based on the

correspondent relationships;

calculating a first correlative value, which represents ~~the~~ <u>a</u> degree of correlation

between the images within the reference patch of the reference frame and the coordinate

converted frame;

increasing the number of <u>said at least one</u> rectangular regions within the reference

patch and the second patch in a stepwise manner by one step, estimating the ~~aforementioned~~

correspondent relationships, obtaining the coordinate converted frames, and calculating the

correlative value, thereby obtaining a second correlative value;

calculating the variation between the first and second correlative values;

increasing the number of said at least one rectangular regions within the reference

patch and the second patch in a stepwise manner an additional step, estimating the

aforementioned correspondent relationships, obtaining the coordinate converted frames,

calculating the first and second correlative values, and calculating the variation between the first

and second correlative values of consecutive steps, until the variation becomes less than or equal

to a predetermined threshold value;

obtaining an intermediate synthesized frame having a higher resolution than either

the reference frame of the other frame, by administering interpolation calculations on the images

within the second patch and the reference patch, based on the correspondent relationships, which

were estimated among the pixels of the reference patch and the second patch having the number

of said at least one rectangular regions therein that yielded the variation less than or equal to the

threshold value;

obtaining a plurality of intermediate synthesized frames by estimating the

aforementioned correspondent relationships, obtaining the coordinate converted frames,

calculating the plurality of correlative values, and calculating the variations among the plurality

of the correlative values, for all of the plurality of sampled frames; and

generating a synthesized frame by synthesizing the plurality of intermediate

synthesized frames.

50. (currently amended): A recording medium having embodied thereon Aa program

that causes a computer to execute a method for synthesizing moving images, comprising the

procedures of:

sampling at least three consecutive frames from a moving image;

providing a reference patch having at least one rectangular region therein, in a

first frame from among the at least three sampled frames, which is designated as a reference

frame;

providing a second patch, which is the same as the reference patch, in another of

the plurality of sampled frames;

moving and/or deforming the second patch in the other frame so that an image

within the second patch matches that within the reference image;

estimating correspondent relationships among the pixels within the second patch

of the other frame and the pixels within the reference patch of the reference frame, based on the

second patch after the movement and/or deformation thereof and the reference patch;

obtaining a coordinate converted frame, by coordinate converting the image

within the second patch into a coordinate space of the reference frame, based on the

correspondent relationships;

calculating a first correlative value, which represents the a degree of correlation

between the images within the reference patch of the reference frame and the coordinate

converted frame, for each of the rectangular regions;

increasing the number of said at least one rectangular regions within the reference

patch and the second patch in a stepwise manner by one step, estimating the aforementioned

correspondent relationships, obtaining the coordinate converted frames, and calculating the

correlative value, thereby obtaining a second correlative value;

calculating the variation between the first and second correlative values for each

of the rectangular regions;

increasing the number of <u>said at least one</u> rectangular regions within the reference

patch and the second patch in a stepwise manner an additional step, estimating the

~~aforementioned~~-correspondent relationships, obtaining the coordinate converted frames,

calculating the first and second correlative values, and calculating the variation between the first

and second correlative values of consecutive steps, until the variation or a representative

variation of all of <u>said at least one</u>~~the~~ rectangular regions, or of <u>said at least one</u>~~the~~ rectangular

regions at predetermined positions from among all of <u>said at least one</u>~~the~~ rectangular regions,

other than those for which the variation is greater than or equal to a predetermined value, or of a

predetermined number of <u>said at least one</u> rectangular regions from among all of <u>said at least</u>

<u>one</u>~~the~~ rectangular regions, other than those for which the variation is greater than or equal to a

predetermined value, becomes less than or equal to a predetermined threshold value;

obtaining an intermediate synthesized frame having a higher resolution than either

the reference frame of the other frame, by administering interpolation calculations on the images

within the second patch and the reference patch for each region corresponding to <u>said at least</u>

<u>one</u>~~the~~ rectangular regions, based on the correspondent relationships, which were estimated

among the pixels of the reference patch and the second patch having the number of <u>said at least</u>

<u>one</u> rectangular regions therein that yielded the variation or the representative variation less than

or equal to the threshold value;

obtaining a plurality of intermediate synthesized frames by estimating the

~~aforementioned~~ correspondent relationships, obtaining the coordinate converted frames,

calculating the plurality of correlative values, and calculating the variations among the plurality

of the correlative values, for all of the plurality of sampled frames; and

generating a synthesized frame by synthesizing the plurality of intermediate

synthesized frames.

51-60. (canceled).